

SOME REMARKS ON THE  
NEUTRON ELASTIC- AND INELASTIC-SCATTERING  
CROSS SECTIONS OF PALLADIUM†

by

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ABSTRACT

The cross sections for the elastic-scattering of 5.9, 7.1 and 8.0 MeV neutrons from elemental palladium were measured at forty scattering angles distributed between  $\approx 15^\circ$  and  $160^\circ$ . The inelastic-scattering cross sections for the excitation of palladium levels at energies of 260 keV to 560 keV were measured with high resolution at the same energies, and at a scattering angle of  $80^\circ$ . The experimental results were combined with lower-energy values previously obtained by this group to provide a comprehensive data base extending from near the inelastic-scattering threshold to 8 MeV. That data base was interpreted in terms of a coupled-channels model, including the inelastic excitation of one- and two-phonon vibrational levels of the even isotopes of palladium. It was concluded that the palladium inelastic-scattering cross sections, at the low energies of interest in assessment of fast-fission-reactor performance, are large ( $\approx 50\%$  greater than given in widely used evaluated fission-product data files). They primarily involve compound-nucleus processes, with only a small direct-reaction component attributable to the excitation of the one-phonon,  $2^+$ , vibrational levels of the even isotopes of palladium.

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